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0^s value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p} preliminary
^{r} revised
x suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E} use with caution
F too unreliable to be published
* significantly different from reference category ($p < 0.05$)

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Overview of the study

This study analyses trends in co-operative education (co-op) participation for graduates with a college certificate or diploma or a university bachelor's degree from 1986 to 2010 in Canada, based on data from the National Graduates Survey (NGS). Changes in co-op participation rates over time are examined, along with differences by field of study. The reasons behind the increase in co-op participation rates of women are also explored.

- As the number of programs and institutions offering co-op programs rose in past decades, the proportion of college graduates who participated in a co-op program rose from 7% in 1986 to 22% in 2010. Similarly, the proportion of co-op participants among graduates with a bachelor's degree rose from 5% to 12% over the same period.
- In 2010, the highest co-op participation rates among college graduates were found in Manitoba (32%), Ontario (31%) and Nova Scotia (27%). Among graduates with a bachelor's degree, Newfoundland and Labrador and British Columbia had the highest participation rates (19% and 18%, respectively).
- In 2010, 37% of graduates with a bachelor's degree in architecture or engineering participated in a co-op program—the highest co-op participation rate of all major fields of study. In contrast, the participation rate was lower among graduates with a bachelor's degree in social sciences, psychology and law (8%).
- Between 1986 and 2010, the co-op participation rate of graduates with a bachelor's degree in commerce, management and public administration rose from 4% to 17%. As a result, one quarter of co-op participants with a bachelor's degree were from this field of study in 2010.
- Of bachelor's graduates who participated in a co-op program, the proportion of females rose from 42% in 1986 to 55% in 2010, mainly because co-op participation rates have increased in fields of study that have a higher proportion of females.

Introduction

Co-operative education (co-op) is a form of work-integrated learning that alternates periods of in-class learning with periods of paid work. Co-op programs provide students with an opportunity to apply what they learned in school in a real work environment. Co-op programs also have the potential to ease the school-to-work transition by providing new graduates with the experience that they need and with a useful network of contacts.

The work experience acquired through a co-op program may also help graduates get the experience they need to be considered for entry-level positions. A recent study published in 2014 by the Higher Education Quality Council of Ontario found that less than one-quarter of employers posting entry-level job ads would consider hiring a candidate with no work experience, and that the vast majority of these employers demanded at least one year of work experience.[1] A follow-up to that study found that almost 60% of those hired in such entry-level jobs had three or more years of work experience.[2]

Participation in a co-op program has also been associated with better labour market outcomes in past research. In a study based on data from the 2005 National Graduates Survey (NGS), graduates with a college certificate or

diploma or a university bachelor's degree (henceforth referred to as college and bachelor's graduates) who participated in a co-op program had higher earnings than those who did not participate in one—a finding that was particularly true for male bachelor's graduates. Male college co-op participants and female bachelor's co-op participants also had higher employment rates than their respective counterparts who did not participate in a co-op program.[3]

Co-op programs can also be advantageous for employers and for the educational institutions that offer them. In the case of employers, co-op participants may represent a potential pool of new hires with some work experience, while, for educational institutions, co-op programs can represent a key marketing tool to attract students since many prefer to engage in programs that include cooperative education.[4] Examining the extent to which Canadian graduates of postsecondary institutions participate in co-op programs is therefore important.

According to a study from the mid-1990s, the number of Canadian universities offering co-op programs rose from 11 in 1978/1979 to 39 in 1993/1994, which translated into an increase in the number of students enrolled in such programs from 10,000 to 31,000 during that period.[5] However, little is known about whether co-op participation rates continued to increase over the 1990s and 2000s.

In this study, trends in co-op participation rates are examined for the period from 1986 to 2010 by combining data from the various cycles of the National Graduates Survey (see *Data sources, methods and definitions*). The changes in participation rates are also examined by region, field of study and sex.

Co-op participation rates increased significantly among college graduates

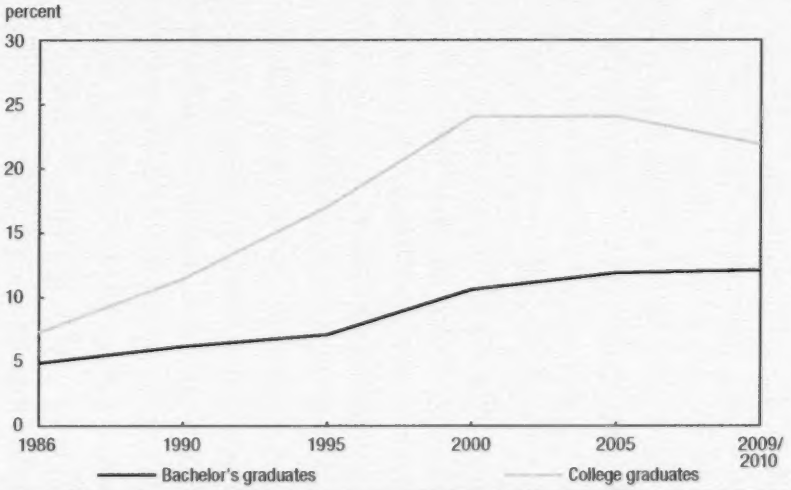
In the 25 years following 1986, the co-op participation rate—expressed as a percentage of college and bachelor's graduates who completed a co-op program—increased significantly (Chart 1). In 1986, 7% of college graduates had participated in a co-op program. By 2000 and 2005, about 1 in 4 (24%) college graduates had participated in a co-op program. In 2010,[6] the most recent NGS data cycle, graduates with a co-op experience accounted for 22% of all college graduates in Canada. Over the period, the number of college graduates with a co-op experience rose, from 4,700 in 1986 to 28,300 in 2010.

The proportion of co-op graduates also increased for graduates with a bachelor's degree, but less than the rate for college graduates. In 1986, 5% of all bachelor's graduates (representing about 4,200 people) were from a co-op program; by 2010, 12% of graduates from university (representing 20,600 graduates) were from a co-op program. In all years, college graduates were more likely to participate in a co-op program than university graduates.

Ontario has the highest proportion of co-op participants among college graduates

During the period, the proportion of overall graduates with a college diploma from Ontario ranged from 41% (in 1990) to 51% (in 2000). That province, however, consistently had more than its share of college co-op graduates. In 1986, for example,

Chart 1
Co-op participation rate of college and bachelor's graduates, 1986, 1990, 1995, 2000, 2005, 2009/2010



Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

47% of all college graduates were from Ontario, while 74% of all college co-op graduates were from that province (Chart 2).

Ontario's share of college co-op graduates nonetheless declined over the years—from 74% in 1986 to 65% in 2010—as the co-op participation rates of graduates from other provinces increased over the period.

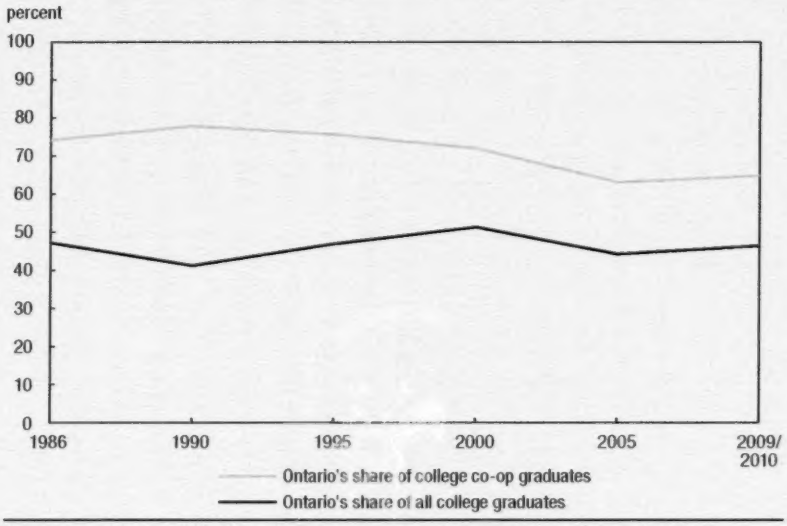
In 1986, 12% of college graduates from Ontario had participated in a co-op program compared with 7% for all of Canada (Table 1). Newfoundland and Labrador (11%) was the only other province besides Ontario to have a participation rate above the Canadian average.

By 2010, Ontario's college co-op participation rate (31%) was nine percentage points higher than the Canadian average (22%), and was still significantly higher than the rates for the majority of provinces. For the first time, however, two other provinces had co-op participation rates that were similar to Ontario's: Manitoba (32%) and Nova Scotia (27%).

At the bachelor's level, Newfoundland and Labrador had the highest co-op participation rate from 1986 to 2010. In 1986, Newfoundland and Labrador's rate (12%) was 2.5 times higher than the overall Canadian rate (5%). As co-op participation rose in the rest of the country, the gap between Newfoundland and Labrador and the rest of the country narrowed. By 2010, Newfoundland and Labrador's participation rate (19%) was 1.5 times higher than the Canadian average (12%).

In addition to Newfoundland and Labrador, the only other province with a significantly higher co-op participation rate than Ontario in 2010 was British Columbia (18%, versus 13% for Ontario). This represents a change from 1986, when British Columbia had a lower proportion of co-op graduates than Ontario.

Chart 2
Ontario's share of college co-op graduates and Ontario's share of all college graduates, 1986, 1990, 1995, 2000, 2005, 2009/2010



Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

At the bachelor's level, New Brunswick, Quebec, Manitoba and Saskatchewan had co-op participation rates below the overall Canadian average throughout the period (for the years with available data). Manitoba's relatively lower co-op participation rate at the bachelor's level contrasts with its higher rate at the college level in 2010.

The co-op participation rate increased faster in some fields of study

The co-op program participation rates also vary by field of study. The analysis in this section focuses on graduates with a bachelor's degree as college-level field of study data from the older waves of the NGS are not comparable to the 2000 Classification of Instructional Programs (CIP).

For the purposes of this study, fields of study have been regrouped into five broad categories that are comparable over time: social sciences, psychology and law; commerce, management and public administration; physical sciences, mathematics and computer sciences; architecture and engineering; and all other fields of study.[7]

In 2010, nearly 4 in 10 graduates of architecture and engineering programs were participants in a co-op program—the highest rate for all fields of study (Chart 3). In this field, the participation rate more than doubled in 15 years—from 17% in 1986 to 37% in 2000—but remained stable from 2000 to 2010.

Table 1
Percentage of co-op program graduates, Canada and provinces, 1986, 1990, 1995, 2000, 2005, 2009/2010

	1986	1990	1995	2000	2005	2009/2010
	percent					
College graduates						
Canada	**7.3**	**11.5**	**17.1**	**24.1**	**24.1**	**21.9**
Newfoundland and Labrador	10.5	x	7.9*	15.4*	22.7*	22.3*
Prince Edward Island	6.1*	x	7.3*	15.0*	22.1*	16.3*
Nova Scotia	6.5*	11.0*	15.5*	18.5*	19.5*	27.0
New Brunswick	5.0*	x	6.5*	22.2*	20.3*	18.3*
Quebec	1.5*E	1.5*E	4.9*	10.5*	13.4*	12.5*
Ontario (ref.)	11.6	21.7	27.6	33.8	34.5	30.6
Manitoba	5.4*	7.5*	18.9*	23.7*	29.8*	32.3
Saskatchewan	5.8*	12.2*	21.9*	14.6*	19.7*	14.7*
Alberta	5.0*	5.4*	6.2*	13.0*	15.9*	13.1*
British Columbia	4.3*	7.4*	8.1*	12.6*	13.5*	9.5*E
Bachelor's graduates						
Canada	**4.9**	**6.2**	**7.1**	**10.6**	**11.9**	**12.1**
Newfoundland and Labrador	12.4*	13.6*	15.9*	19.7*	17.8*	18.8*
Prince Edward Island	x	x	x	10.2	12.4	6.7*E
Nova Scotia	3.7*E	4.8*	9.6	13.6	14.5	16.1
New Brunswick	x	3.1*	3.4*	7.8*	8.3*	7.9*
Quebec	3.1*	5.7*	6.6	8.9*	9.1*	7.3*
Ontario (ref.)	7.1	7.3	7.9	11.3	13.3	13.4
Manitoba	x	x	3.6*	3.3*	6.6*	7.2*
Saskatchewan	4.0*E	4.0*E	5.0*	6.8*	10.0*	10.7
Alberta	1.3*	3.0*E	3.9*	9.3	12.9	10.0*
British Columbia	4.2*	7.5	8.9	14.2*	12.4	17.6*

x suppressed to meet the confidentiality requirements of the *Statistics Act*
E use with caution
* significantly different from reference category (ref.) ($p < 0.05$)
Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

The high degree of participation in co-op programs is not necessarily surprising for students in architecture and engineering, given that co-op programs were first implemented in engineering faculties.[8] Furthermore, these types of occupations often have professional associations whose memberships depend not only the completion of a degree, but also on the accumulation of work experience.[9]

In 2010, 21% of graduates of physical sciences, mathematics and computer sciences participated in a co-op program, up from 16% in 1986. In this field, the rates also remained largely unchanged from 1990 to 2010—the co-op participation rate varied between 21% and 24% during that period.

In contrast, the participation rate of graduates of commerce, management and public administration programs rose steadily over the period. In 1986, 4% of graduates from these programs had participated in a co-op program. By 2010, their participation rate was 17%. Most of the increase took place from 1986 to 2000.

Although the participation rate of social science, psychology and law graduates remained lower than the rate for other program categories, their participation rate rose steadily over the period, from 2% in 1986 to 8% in 2010.

Despite having the largest co-op participation rates, architecture and engineering graduates, and physical science, mathematics and computer science graduates account for a relatively small proportion of the overall number of co-op participants. That is due to the fact that these fields account for a small proportion of the overall number of bachelor's graduates.

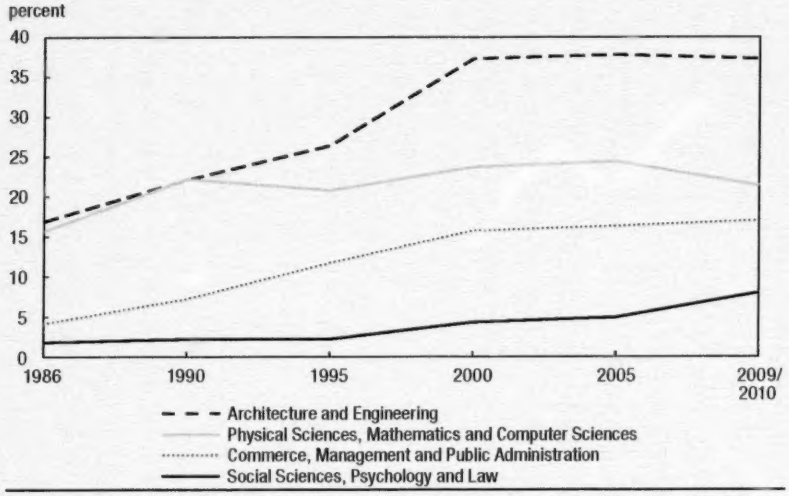
In 2010, for example, just over 1 in 10 of all graduates were from one of these two fields. In contrast, 22% of graduates were from social sciences, psychology and law, while another 18% were from commerce, management and public administration programs.

Since the co-op participation rate increased in these two large categories of programs, the profile of co-op participants naturally changed over time (Chart 4).

In 1986, over one-half (56%) of co-op graduates were from two particular fields: architecture and engineering programs (31%), and physical science, mathematics and computer science programs (25%). The share of co-op graduates in these two program categories progressively declined over time—both categories accounted for less than one-third (29%) of co-op graduates in 2010 (i.e., 22% were from architecture and engineering programs, while 7% were from physical science, mathematics and computer science programs).

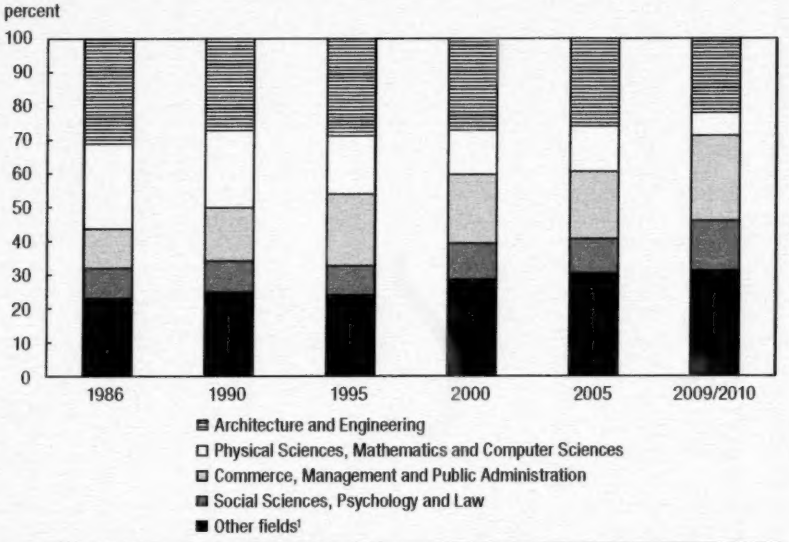
In 1986, about 1 in 5 co-op graduates were from commerce, management and public administration programs (12%), as well as from social sciences, psychology and law (9%). By 2010, 4 in 10 co-op participants were from commerce, management, public administration, social sciences and law (i.e., 25% were from commerce, management and public administration; and 15% were from social sciences, psychology and law). The proportion of co-op participants

Chart 3
Co-op participation rate of bachelor's graduates by selected fields of study, 1986, 1990, 1995, 2000, 2005, 2009/2010



Note: The co-op participation rates for other fields are not shown because the coefficients of variation were too large for some of the years. Other fields include Humanities and the Arts; Educational Studies; Health Professions and Recreation; and Biological, Biomedical and Agricultural Sciences and Natural Resources.
Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

Chart 4
Distribution of bachelor's co-op graduates by field of study, 1986, 1990, 1995, 2000, 2005, 2009/2010



1. Other fields include Humanities and the Arts; Educational Studies; Health Professions and Recreation; and Biological, Biomedical and Agricultural Sciences and Natural Resources.
Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

from other fields also rose over the period, from 23% in 1986 to 31% in 2010.[10]

Women increased their share of co-op graduates at the bachelor level

In 1986, women accounted for 55% of all graduates with a bachelor's degree, but for 42% of graduates who had participated in a co-op program (Chart 5). By 2010, however, women accounted for 60% of overall graduates with a bachelor's degree and for 55% of all co-op graduates—a smaller gap than in 1986.

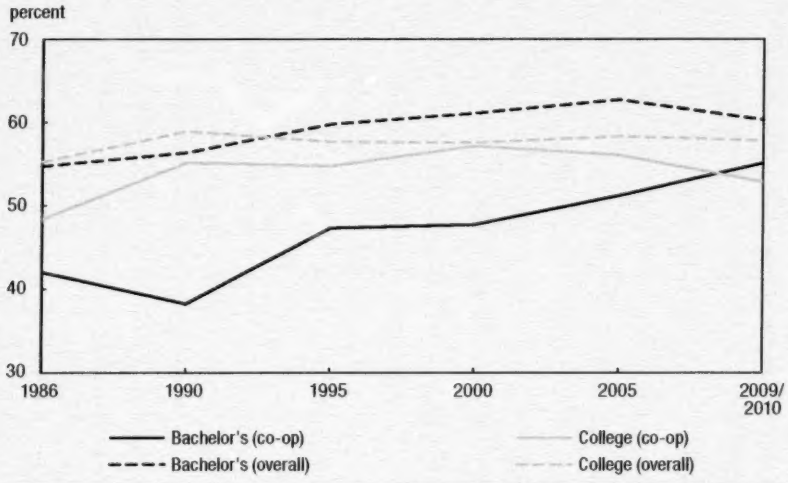
The increase in the representation of women among co-op graduates over time is mainly due to the fact that co-op programs became more prevalent in fields of study that have a higher proportion of females (such as social sciences, psychology and law).[11]

Among college graduates, the proportion of female co-op participants fluctuated less over time, and was closer to the overall proportion of female graduates.

Conclusion

In Canada, co-op programs have long been an important feature of the postsecondary education system. Co-op programs may facilitate the school-to-work transition of new graduates and provide an opportunity for students to acquire the experience they need to get hired. The preceding analysis shows that there have been significant changes to co-operative education over the past quarter century. As the number of institutions and programs offering co-op programs rose over time, there has been a significant increase in the co-op participation

Chart 5
Proportion of female graduates among all graduates and among graduates of co-op programs, 1986, 1990, 1995, 2000, 2005, 2009/2010



Source: Statistics Canada, National Graduates Survey, classes of 1986, 1990, 1995, 2000, 2005 and 2009/2010.

rate at the national level, especially in college programs, with all provinces contributing to the increase.

There was also a substantial shift in the fields of study providing co-operative education at the bachelor's level during the period under study. Traditional co-op fields, such as architecture and engineering; and physical sciences, mathematics and computer sciences, went from producing over one-half (56%) of co-op graduates in 1986 to producing less than 30% in 2010. That is because the co-op participation rates increased in fields with a relatively large number of graduates such as commerce, management and public administration; and social sciences, psychology and law.

The increasingly diverse fields of study providing co-op programs at the bachelor's level have coincided with the increasing representation of women in co-op programs at that level. As the co-op participation rates increased in fields of study with higher proportions of females (such as social sciences, psychology and law), women started to account for a greater share of bachelor's-level co-op graduates—women's share of these graduates increased steadily from about 4 in 10 (42%) in 1986 to over one-half (55%) in 2010.

More research is needed to understand the impact of co-op education in Canada, particularly in view of the fact that work experience plays a significant role in helping young people fully integrate into the labour market.[12]

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Data sources, methods and definitions

Data sources

This analysis uses various waves of the National Graduates Survey (NGS), including the 1986, 1990, 1995, 2000, 2005 and 2009/2010 cohorts. The NGS is a survey of graduates from Canadian public postsecondary education institutions who graduated or completed the requirements for degrees, diplomas or certificates in a given year. For the first time, using the 2009/2010 cohort, the reference period was graduates during the school year rather than during the calendar year as was the case for previous cohorts. (In this paper, 2010 refers to the 2009/2010 cohort). The population of interest for this paper is graduates with a college certificate or diploma or a university bachelor's degree.

The NGS gathers detailed information on graduates' program of study and includes a question on whether their program was a co-op program. In all waves of the NGS, the survey was conducted two years after graduation, except for the 2009/2010 class of graduates for whom data were collected three years after graduation. This difference does not have an impact on this particular study as the type of program (co-op or not) is not influenced by when the survey is conducted. The provincial results are based on the province in which students attended school rather than on their province of birth or residence.

Of note are the response rates for the different waves of the National Graduates Survey, which declined over the period from a high of almost 80% for the 1995 cohort to a low of 49% for the class of 2009/2010. The estimation strategy used in each cycle of the National Graduates Survey includes weight adjustments aimed at compensating for different issues such as non-response. Response patterns were studied carefully to appropriately adjust for non-response by creating response homogeneous groups (RHG) based on the observable characteristics of the respondents and the non-respondents.

Definitions

Co-op programs

Canadian co-op programs have been certified since 1973 by the Canadian Association for Co-operative Education (CAFCE), and, as a result, the definition of co-op programs has changed very little over time and across institutions in the Canadian context. According to the definitions provided by CAFCE and by a previous Statistics Canada study on co-op participation[13], a co-op program must meet the following criteria in order to be certified:

1) each work situation is developed and/or approved by the co-operative educational institution as a suitable learning situation;
2) the co-operative student is engaged in productive work rather than merely observing;
3) the co-operative student receives remuneration for the work performed;
4) the co-operative student's progress on the job is monitored by the co-operative educational institution;
5) the co-operative student's performance on the job is supervised and evaluated by the student's co-operative employer;
6) the time spent in periods of work experience must be at least 30% of the time spent in academic study.

Given this consistent definition over time, the National Graduates Survey (NGS) has been able to gather data on co-op participation since 1982. Like the CAFCE definition, the question in the NGS about co-op has changed little over time and includes a definition of co-op in the following question: "This is a program that is specifically called a co-operative program by the institution. It alternates periods of paid work and study." While there are many forms of work-integrated learning, this study focuses specifically on co-op programs and not on other examples of work-integrated learning. Other types of work-integrated learning not included in this study include, for example, apprenticeship programs or other forms of work-integrated learning such as articling (among law students) or the teaching practicum in an education program. This makes it possible to look at how co-op has evolved in the Canadian context, using multiple waves of the NGS.

While the survey questions that graduates were asked about participation in co-op programs were similar in all cycles, readers should note that the data are self-reported.

Fields of study

The field of study data gathered in the NGS were coded differently in different years. From 1986 to 1995, fields of study were coded using the University Student Information System (USIS) classification, and from 2000 to 2010, they were coded using the Classification of Instructional Programs (CIP 2000). In order to make these two classifications comparable over time, this study uses the Concordance: NGS University-level Historical Groupings to University Student Information System (USIS), which were created to perform this kind of comparison.

Notes

1. See Borwein (2014).
2. See Refling and Borwein (2014).
3. See Walters and Zarifa (2008).
4. See Haddara and Skanes (2007).
5. See Darch (1995).
6. For the 2009/2010 cohort, the reference period for the first time was graduates during the school year rather than during the calendar year, as was the case with previous cohorts. In this study, however, this cohort is referred to as the 2010 cohort for simplicity.
7. The field of study data collected in the National Graduates Survey were coded differently in different years. See *Data sources, methods and definitions* for more information.
8. See Haddara and Skanes (2007).
9. For example, the Ontario Fairness Commissioner describes the work experience that the professional designation for architects and engineers requires.
10. Other fields include studies in humanities and the arts; educational studies, health professions and recreation; biological, biomedical and agricultural sciences and natural resources; and all other fields of study not elsewhere classified.
11. Another possibility is that the share of female graduates increased in programs with a high degree of co-op participation. However, the proportion of female graduates changed only slightly in these programs. In 2010, the proportion of female graduates in architecture, engineering, physical science, mathematics and computer science programs was 22%. In 1986, the proportion was 21%.
12. See LaRochelle-Côté (2013).
13. See Darch (1995).

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